

REMARKS

Claims 1, 2, and 9 are currently being amended. The amendments presented herein do not introduce new matter within the meaning of 35 U.S.C. §132. Accordingly, the Examiner is respectfully requested to enter these amendments.

1. Rejection of Claims 1-4 and 9 Under 35 U.S.C. §102(b)/103(a)
to U.S. Patent 5,529,845

Applicant respectfully traverses the rejection of claims 1-4 and 9 as being anticipated by, or in the alternative being unpatentable over U.S. Patent 5,529,845 (herein referred to as, "Branchesi, et al") as evidenced by U.S. Patent 4,755,546 (herein referred to as, "Hechenbleikner, et al.>").

As is well-settled, for a reference to anticipate an invention, all of the elements of that invention must be present in the reference. The test for anticipation under section 102 is whether each and every element as set forth in the claims is found, either expressly or inherently, in a single prior art reference. *Verdegaal Bros. V. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must also be arranged as required by the claim. *In re Bond*, 15 USPQ2d 1566 (Fed. Cir. 1990).

Additionally, the U.S. Supreme Court in *Graham v. John Deere Co.*, 148 U.S.P.Q. 459 (1966) held that non-obviousness was determined under §103 by (1) determining the scope and content of the prior art; (2) ascertaining the differences between the prior art and the claims at issue; (3) resolving the level of ordinary skill in the art; and, (4) inquiring as to any objective evidence of non-obviousness.

Accordingly, for the Examiner to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. See MPEP §2142.

With respect to the instant rejection, Applicant respectfully believes Branchesi, et al. alone, or in view of Hechenbleikner, et al., fails to disclose, teach, or suggest Applicant's currently claimed fibers comprising a propylene polymer composition (A) having an MFR value (MFR (1)) from 6 to 150 g/10 min. and a **tenacity value higher than 23 cN/tex**, the propylene polymer composition (A) comprising: ii) a crystalline propylene polymer composition having a melting temperature of 153° C or higher, a content of

fraction soluble in xylene at room temperature lower than 10% by weight; the crystalline propylene polymer composition comprising (percent by weight): I) 20-80% of a crystalline **propylene homopolymer**; and II) 20-80% of a crystalline **propylene random copolymer** selected from: IIa) a copolymer of propylene with 0.8 to 5% by weight of **ethylene**; provided that the difference in the ethylene content between polymer I) and polymer IIa) be at least 0.8 percentage unit with respect to the weight of the (co)polymer concerned. In particular, Applicant has unexpectedly found that when fibers are produced from propylene compositions comprising, at the very least, 20-80% of a crystalline propylene homopolymer and 20-80% of a crystalline, random propylene copolymer having 0.8 to 5% by weight of **ethylene**, the resultant fibers have improved tenacity values (i.e., higher than 23 cN/tex).

Alternatively, Branchesi, et al. discloses in col. 1, line 50 - col. 2, line 22,

Accordingly the present invention provides a noncomposite, undrawn fiber for nonwoven fabrics having thermowelding strength equal to or greater than 5 Newtons and/or flexibility higher than 800, comprising a polymer material additivated with organic phosphites and/or phosphonites, HALS (hindered amine light stabilizers) and optionally phenolic antioxidants, said polymer material being selected from:

- 1) isotactic propylene homopolymers having an isotactic index greater than 90;
- 2) random copolymers of propylene with ethylene and/or a C₄-C₈ α -olefin; and
- 3) blends of homopolymers 1) with copolymers 2) , or

blends of at least one of the above mentioned homopolymers and copolymers with heterophasic propylene polymers, said heterophasic polymers comprising (by weight):

A) from 10 to 60 parts of a propylene homopolymer, or a copolymer of propylene with ethylene and/or a C₄-C₈ α-olefin, containing over 80% of propylene and having an isotactic index greater than 80 (Fraction A);

B) from 1 to 25 parts of an essentially linear semicrystalline **copolymer of ethylene** with a C₃-C₈ α-olefin, insoluble in xylene at ambient temperature (Fraction B); and

C) from 15 to 87 parts of a **copolymer fraction of ethylene** with propylene and/or a C₄-C₈ α-olefin, and optionally minor quantity of diene, said copolymer fraction containing from 10 to 80% of **ethylene** and being soluble in xylene at ambient temperature (Fraction C).;

said fiber being obtained by a spinning process operating with a real or equivalent output hole diameter of less than 0.5 mm, with a hole flow-rate ranging from 0.1 to 0.6 g/minute and at a spinning temperature ranging from 260° C. to 320° C., using polymers (1) or (2), or polymer blends (3), having MFR from 5 to 40 g/10 min, and in the absence of a drawing step. (Emphasis added)

Accordingly, Branchesi, et al. clearly does not disclose or teach Applicant's claimed fibers produced from the specifically claimed propylene polymer compositions comprising, at the very least, I) 20-80% of a crystalline **propylene homopolymer**; and II) 20-80% of a crystalline **propylene random copolymer** selected from: IIa) a copolymer of propylene with 0.8 to 5% by weight of **ethylene**. Therefore, for this reason alone, Applicant respectfully believes the instant rejection should be withdrawn.

Notwithstanding, Branchesi, et al. additionally discloses in

col. 2, lines 29-32,

The random copolymers 2) contain a quantity of comonomer ranging from 0.05 to 20% by weight. When the quantity of comonomer exceeds 5%, said copolymers must be blended with the propylene homopolymer.

In other words, Branchesi, et al. teaches that if the comonomer content exceeds 5% in the random copolymers 2), then the copolymers **must** be blended with the propylene homopolymer. As such, if the comonomer content does not exceed 5% in the random copolymers 2), then according to the invention of Branchesi, et al., the copolymers do not have to be blended with the propylene homopolymer.

Alternatively, Applicant has unexpectedly found that when 20-80% of a propylene copolymer comprising a commoner content of **0.8 to 5% by weight of ethylene** is combined with 20-80% of a propylene homopolymer, the fiber produced from the resultant polymeric composition unexpectedly comprises much higher tenacity values than propylene homopolymers not having the propylene copolymer present. In fact, the Examiner's attention is directed towards Examples 3 and 13 in Applicant's specification, versus Comparative Example 7c. Example 3 is derived from Example 1 (see page 18 in Applicant's specification), while Example 13 is derived from Example 12, wherein Example 12 is prepared using the same catalyst as Example 1. Accordingly, in both Examples 3 and 13 a propylene polymer composition comprising a propylene homopolymer and a **propylene copolymer** having an **ethylene comonomer content of 0.8 to 5% by**

weight are produced. Alternatively, in Comparative Example 7c, Example 13 is repeated; however, the propylene polymer composition comprises **only a propylene homopolymer** (see page 24, lines 9-14 in Applicant's specification). The resultant fibers from Examples 3 and 13 have tenacity values of **26.8 cN/tex and 26.0 cN/tex, respectively**, whereas the fibers of Comparative Example 7c have a tenacity value of **21.1 cN/tex**. As such, the fibers comprising the propylene copolymer having an ethylene content of 0.8 to 5% by weight, along with the propylene homopolymer, unexpectedly have tenacity values that are **27% and 23.2% higher** than fibers comprising only the propylene homopolymer. Therefore, in light of the above, Applicant respectfully believes the currently claimed fibers are novel and patentably distinguishable from Branchesi, et al. alone, or in view of Hechenbleikner, et al.

Now turning to Hechenbleikner, et al., which is being relied upon in the rejection of claim 3 in the instant Office Action, Applicant responds as follow. In particular, Hechenbleikner, et al. relates to **preventing** oxidative deterioration of olefin polymer compositions by adding a pentaerythritol monoacetal phosphite ester thereto. However, this is clearly juxtaposed to Applicant's currently claimed fiber outlined in claim 3 in which the propylene polymer composition (A) is obtained by chemical degradation of a precursor polymer composition (B). In fact, since Hechenbleikner, et al. relates to using a particular class of pentaerythritol

monoacetal phosphite esters to prevent degradation of olefin polymers, which is completely opposite what Applicant is currently claiming, Applicant respectfully believes this is the antithesis of obviousness. As such, Applicant respectfully believe the instant rejection to Branchesi, et al. in view of Hechenbleikner, et al. should be withdrawn.

Furthermore, the instant Office Action states on page 4, lines 1-10,

Finally, regarding applicants' argument against the use of *In re Aller*, it is noted that applicant has not overcome the rejections as set forth in the previous office action as there is no mention of unexpected results. Further, examiner is unclear as to where the MPEP 2144 teaches that the *In re Aller* case is directed to identical processes. The pending claims of the instant application are directed to a product and not a process. Further, it is noted that applicant recites that the only difference between appellants process and the prior art reside in the temperature in which the process was carried out, and the concentration of the sulfuric acid used. (See pg. 8-9) Therefore, examiner has reason to believe that the fiber of Branchesi et al. is at minimum a prima facie case of obviousness over the instant application.

With respect to the Examiner's contention that Applicant has not mentioned any unexpected results with respect to the currently claimed fibers in view of Branchesi, et al., in light of Applicant's arguments above, Applicant respectfully believes this issue is now moot. As for the Examiner's inquiry regarding where *In re Aller* is directed towards "identical processes" in the MPEP, wherein identical processes means the steps and constituents of the process

are identical with the **only** difference residing in the temperature and the concentration of the sulfuric acid used, the Examiner is directed to MPEP §2144.05 (II)(A), which states,

Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) (Claimed process which was performed at a temperature between 40°C and 80°C and an acid concentration between 25% and 70% was held to be *prima facie* obvious over a reference process which differed from the claims only in that the reference process was performed at a temperature of 100°C and an acid concentration of 10%.) (Emphasis added)

As outlined in Applicant's previous response on page 8, line 16 - page 9, line 8, which is incorporated herein by reference in its entirety, Applicant states,

As for the Examiner's reliance on *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) throughout the current Office Action, as well as in the rejection of claim 4, Applicant respectfully believes the facts of *In re Aller* are clearly different than those of the instant application. See MPEP §2144 (III). In particular, *In re Aller* relates to **identical** processes (i.e., identical in steps and constituents of the process), in which the **only** difference between appellants process and the prior art resided in the temperature in which the process was carried out, and the concentration of the sulfuric acid used. This, however, is markedly different than the facts before the Examiner in the instant application. In fact, as outlined *supra*, Applicant respectfully believes the currently claimed fibers comprising the crystalline **propylene** polymer composition (ii) comprising, in part, components IIa-IIc are markedly different than those of Branchesi, et al. Accordingly, Applicant respectfully

traverses the Examiner's reliance on *In re Aller*, *Id.*
(Emphasis in original)

Therefore, as outlined above, Applicant respectfully traverses the Examiner's use of *In re Aller* given the clear differences in facts surrounding the decision in *In re Aller* versus those in front of the Examiner in the instant application. In fact, the MPEP states in §2144 (III) and §2144.04, respectively,

LEGAL PRECEDENT CAN PROVIDE THE RATIONALE SUPPORTING
OBVIOUSNESS ONLY IF THE FACTS IN THE CASE ARE
SUFFICIENTLY SIMILAR TO THOSE IN THE APPLICATION

The examiner must apply the law consistently to each application after considering all the relevant facts. If the facts in a prior legal decision **are sufficiently similar** to those in an application under examination, the examiner may use the rationale used by the court. If the applicant has demonstrated the criticality of a specific limitation, it would not be appropriate to rely solely on ** the rationale >used by the court< to support an obviousness rejection. 'The value of the exceedingly large body of precedent wherein our predecessor courts and this court have applied the law of obviousness to particular facts, is that there has been built a wide spectrum of illustrations and accompanying reasoning, that have been melded into a fairly consistent application of law to a great variety of facts.' *In re Eli Lilly & Co.*, 902 F.2d 943, 14 USPQ2d 1741 (Fed. Cir. 1990).

2144.04 Legal Precedent as Source of Supporting Rationale
[R-6]

As discussed in MPEP § 2144, if the facts in a prior legal decision **are sufficiently similar** to those in an application under examination, the examiner may use the rationale used by the court. Examples directed to various common practices which the court has held normally require only ordinary skill in the art and hence are

considered routine expedients are discussed below. If the applicant has demonstrated the criticality of a specific limitation, it would not be appropriate to rely solely on case law as the rationale to support an obviousness rejection. (Emphasis added)

Furthermore, Applicant respectfully responds as follows with respect to the Examiner's contention that,

. . . it is noted that applicant recites that the only difference between appellants process and the prior art reside in the temperature in which the process was carried out, and the concentration of the sulfuric acid used. (See pg. 8-9)

However, as outlined *supra*, this is a misinterpretation by the Examiner. In particular, the decision of *In re Aller* was based on a fact pattern that the only differences in appellants process (i.e., not Applicant in the instant application) and the prior art resided in the temperature in which the process was carried out, and the concentration of the sulfuric acid use. However, as outlined above, **this is clearly different than the facts before the Examiner for the instant application.** Accordingly, Applicant maintains the traversal of the Examiner relying on *In re Aller* in the instant rejection given the decision of *In re Aller* was based on facts clearly different than those in the instant application. As such, given the portions of the MPEP highlight above, Applicant respectfully believes any reliance of *In re Aller* should be removed. Applicant has included a copy of the decision of *In re Aller* herewith this response.

In light of the above, Applicant respectfully believes the current obviousness rejection to Branchesi, et al., as evidenced by Hechenbleikner, et al., should be withdrawn.

CONCLUSION

Based upon the above remarks, Applicant respectfully believes the current rejections should be withdrawn. The Examiner is therefore respectfully requested to reconsider and withdraw the rejections, and allow pending claims 1-10. Favorable action with an early allowance of the claims pending in this application is earnestly solicited.

The Examiner is welcomed to telephone the undersigned practitioner if she has any questions or comments, or such action would expedite prosecution of this application.

Respectfully submitted,

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U.S. Patent Application
Serial No. 10/529,022

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As of: Jun 01, 2009

IN RE ALLER ET AL.

No. 6079

United States Court of Customs and Patent Appeals

42 C.C.P.A. 824; 220 F.2d 454; 1955 CCPA LEXIS 224; 105 U.S.P.Q. (BNA) 233

Oral argument January 4, 1955
March 22, 1955

PRIOR HISTORY: [***1] APPEAL from Patent Office, Serial No. 45,326

LexisNexis(R) Headnotes

DISPOSITION: Affirmed.

CASE SUMMARY:

PROCEDURAL POSTURE: Appellant sought a review of the decision of the Board of Appeals of the United States Patent Office rejecting appellant's application for a patent.

OVERVIEW: Appellant's application for a patent involved a process for the production of carboic acid as an ingredient in the production of drugs and explosives. However, the process was identical to that of the prior art, except that appellant's claims specified lower temperatures and higher sulphuric acid concentrations than were previously shown. The court affirmed a decision of the Board of Appeals of the United States Patent Office rejecting the application. The court asserted that experimentation to find the optimum conditions of temperatures and acid concentration was no more than the application of the expected skill of a chemical engineer. The court held that there was no record to support a holding of a patentable invention.

OUTCOME: The court affirmed the decision because the claimed process was merely different in degree and not in kind from the reference process. Moreover, appellant failed to show the criticality of the claimed ranges.

Patent Law > Double Patenting > General Overview
Patent Law > Jurisdiction & Review > Subject Matter Jurisdiction > Appeals

[HN1] A change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art.

Patent Law > Jurisdiction & Review > Subject Matter Jurisdiction > Appeals
Patent Law > Subject Matter > Products > General Overview

[HN2] Even though an applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art.

Patent Law > Inequitable Conduct > Effect, Materiality & Scienter > General Overview
Patent Law > Jurisdiction & Review > Subject Matter Jurisdiction > Appeals

Patent Law > Nonobviousness > Elements & Tests > General Overview

[HN3] A reference may be valid even though it states in so many words that its disclosure is not practical.

COUNSEL: *Clinton F. Miller* for appellants.

E. L. Reynolds (*J. Schimmel* of counsel) for the Commissioner of Patents.

OPINION BY: COLE**OPINION**

[**455] [825] Before GARRETT, Chief Judge, and O'CONNELL, JOHNSON, WORLEY, and COLE, Associate Judges

COLE, Judge, delivered the opinion of the court:

This is an appeal from a decision of the Board of Appeals of the United States Patent Office, affirming the rejection by the Primary Examiner of appellants' application for a patent, Serial No. 45,326, filed August 20, 1948, for "Decomposition of Organic Peroxides." Of the original sixteen claims, claims 11-14 have been withdrawn, and no claims have been allowed, all having been denied as unpatentable over a reference specifically acknowledged in the application as prior art, as hereinafter discussed.

The rejection was made upon an article appearing in the Journal of the German Chemical Society in 1944, by Heinrich Hock and Shon Lang, entitled, "Autoxidation of hydrocarbons, Report no. 9: Concerning peroxides of benzene derivatives." The reference is cited as follows:

Hock et al., Ber. Deut. Chem. Ges., 77B, pages [***2] 257 to 262, 1944.

The application is for a process for the production of phenol (carbolic acid), a chemical with wide uses as an antiseptic and preservative, and as an ingredient in the production of synthetic resins, explosives, drugs, photographic developers, and dyes. Ketones (particularly acetone) are produced as by-products of the process.

Basically, the process sought to be patented involves the treatment of isopropyl benzene hydroperoxide (or similar organic peroxides) with sulphuric acid, wherein the hydroperoxide is decomposed into phenol and acetone (or other ketones). So far as pertinent to this appeal, it is not necessary to inquire into the particular chemical reactions occurring in the process, nor is it necessary to discuss the method by which isopropyl benzene hydroperoxide is formed.

The process of appellants is identical with that of the prior art, except that appellants' claims specify lower

temperatures and higher sulphuric acid concentrations than are shown in the reference. (Some of the claims also specify the use of solvents, but these are better discussed separately.) The main question involved in this appeal is whether the changes in temperature [***3] and in acid concentration amount to invention, or whether such changes would have been obvious to one skilled in the art.

Claim 8 was quoted by the Board of Appeals as illustrative, and reads as follows:

8. Process for decomposing isopropyl benzene hydroperoxide and the production thereby of phenol and acetone which comprises bringing said peroxides into intimate contact with aqueous sulphuric acid of a concentration between 25 and 70% at temperatures between 40 degrees and 80 degrees.

[*826] The reference article shows essentially the same process as that recited in the claims, except that the only experiment discussed in the article was conducted at a temperature of 100 degrees C. and with a 10 percent sulphuric acid solution. '

1 Without subscribing to the accuracy of the translation, we set forth at this point the experiment as described in the reference in the following language:

Acid cleavage: 1.2 g. isopropylbenzol peroxide were heated with 15 ccm. 10% sulfuric acid on the reflux condenser (temperature in the tube 100 degrees, in the condenser 60 degrees. The condenser outlet was connected with a U-tube which contained about 2 ccm. water and was cooled with ice. The reaction mixture was cooled for 1 1/2 hours, 2 g. sodium hydroxide added and then filtered through a wet filter in doing which oily drops (presumably dimethyl-phenyl-carbinol) were left behind. The filtrate was shaken with 1.5 g. of benzoyl chloride and the separated phenyl benzoate recrystallized from alcohol. Melting point 68-69 degrees. Yield 1.15 g. (75% of the theoretical). The mixture melting point with phenyl benzoate showed no reduction.

The aqueous solution in the U. tube showed with sodium nitroprussiate on the addition of ammonia and some solid ammonium chloride a permanganese red coloring (acetone).

[***4] [**456] The Primary Examiner held that the conditions of the claims resulted simply from experimentally varying the different factors of the process to determine the optimum reaction condition and was within the skill of the art; that there was no evidence to

indicate that the reported increase in yields was a difference in kind and not of degree; that no actual commercial success had been shown; that even if commercial success had been shown, it would be insufficient of itself to show invention; and that quickened reaction times were not pertinent to show invention.

The Board of Appeals, in affirming the examiner, stated that experimentation to find the optimum conditions of temperature and acid concentration was "no more than the application of the expected skill of the chemical engineer * * *." The board stated that the record did not show any significant improvement in the efficiency of the process resulting from a difference in temperature, and that the essential question was whether an increase of concentration of acid which resulted in an increase in yield was a difference of degree only, or whether it was a "difference of such magnitude as to justify the allowance [***5] of the claims." The board held that the record failed to support a holding that there was patentable invention. An affidavit submitted by appellants after the examiner's rejection in an attempt to prove that the claimed process was "commercially attractive" while that of the reference was not, was accepted by the board only as further argumentation, and not as evidence.

[1] Normally, [HN1] it is to be expected that a change in temperature, or in concentration, or in both, would be an unpatentable modification. Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. *In re Dreyfus*, 22 C.C.P.A. (Patents) 830, [*827] 73 F.(2d) 931, 24 U.S.Pat.Q. 52; *In re Waite et al.*, 35 C.C.P.A. (Patents) 1117, 168 F.(2d) 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. *In re Swenson et al.*, 30 C.C.P.A. (Patents) 809, 132 F.(2d) 1020, 56 USPQ 372; *In re Scherl*, 33 C.C.P.A. (Patents) 1193, 156 F.(2d) 72, 70 USPQ 204. However, [HN2] even [***6] though applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. *In re Sola*, 22 C.C.P.A. (Patents) 1313, 77 F.(2d) 627, 25 U.S.Pat.Q. 433; *In re Normann et al.*, 32 C.C.P.A. (Patents) 1248, 150 F.(2d) 708, 66 USPQ 308; *In re Irmischer*, 32 C.C.P.A. (Patents) 1259, 150 F.(2d) 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. *In re Swain et al.*, 33 C.C.P.A. (Patents) 1250, 156 F.(2d) 239, 70 USPQ 412; *Minnesota Mining and Mfg. Co. v. Coe*, 69 App.D.C. 217, 99

F.(2d) 986; *Allen et al. v. Coe*, 77 App.D.C. 324, 135 F.(2d) 11.

Bearing in mind the foregoing, we examine the arguments of appellants to determine whether they have demonstrated patentability over the experiment of Hock and Lang.

Appellants specify three improved results from the conditions of the process sought to be patented: increased yields of phenol; increased yields of acetone; and shortened reaction times. These results, it is claimed, combine [***7] to make appellants' process commercially attractive while that of the reference would be commercially unattractive.

[**457] The yield of phenol reported by the reference article was 75 percent of theoretical, whereas the examples of appellants' specification show phenol yields of 83.7 to 100 percent. The reference did not state what acetone yield Hock and Lang obtained, although it did indicate that acetone was produced. Appellants' specification states that in following the conditions of the reference they obtained an acetone yield of about 60 percent. By their own method, appellants report acetone yields of from 71 to 88 percent, the yield, however, not being reported for two examples. The Hock and Lang reference experiment was completed in an hour and a half. Appellants' examples show comparable reaction times ranging from a total time of 20 minutes to 3 hours.

In analyzing these improved results, one is not struck by any difference in kind attributable to appellants' process - logically the improvements could flow equally well from changes in degree resulting from routine variation in temperature or acid concentration. At [*828] the least efficient conditions [***8] reported by appellants, the improvement is but a few percentage points different from the results reported by the reference. At the most efficient conditions, the improvement is still within the range of variation one might expect to result from changes in reaction conditions. There is no temperature range or acid concentration range that can really be termed "critical." As far as is shown, temperatures between 80 degrees and 100 degrees C., and acid concentrations between 10 percent and 25 percent, could result in increasingly greater efficiency, somewhat more than Hock and Lang, somewhat less than appellants. Appellants have not shown anything "critical" about their process, unless lower temperatures and higher acidity generally are critical.

Even the affidavit of Sheffield does little more than compare the results reported by the reference and those reported by appellants, and give an opinion as to how much less costly one would be than the other. The affidavit clearly does not show commercial success. It only presents affiant's opinion that when the price of

phenol is 19 cents a pound, appellants' production would be economically profitable, while that of the reference [***9] would not. His statement is equally compatible with the theory that the improvement is a difference of degree, as it is with the theory that it is a difference of kind.

[2] However, for purposes of discussion, it may be assumed that appellants have shown an improvement over the reference, and that commercial success has been adequately demonstrated. Commercial success or improved results, however, are important only when the question of invention is in doubt. When there is no doubt that improvement resulted from routine efforts of the artisan, then commercial utility is unimportant. [3] To support a patent, it must be shown that the claimed process was not obvious to one skilled in the art, who had before him the Hock and Lang article.

Appellants contend that the claimed conditions would not be discovered by one skilled in the art, because shortened reaction times would not be expected with lower temperatures; increased resinification (and hence lower yields) of phenol and acetone would be expected with stronger acids; and greater danger of explosion would be expected at lower temperatures.

In support of the first argument, appellants state that theoretically reaction [***10] time is doubled or trebled for each 10 degrees C. drop in temperature, while it is only shortened proportionately with an increase in the concentration of a reactant. Hence, it is argued that a skilled chemist would expect the reaction time to be inordinately lengthened by a decrease in temperature, despite an increase in the concentration of the sulphuric acid. Assuming appellants' propositions to be applicable, [*829] it still does not follow that a skilled chemist would not try to shorten the reaction time by lowering the temperature and increasing the acid concentration. Thus, applying appellants' reasoning, at 80 degrees C. and 70 percent acid concentration (which is within the limits of [**458] the claims) it would be expected that the reaction rate would be slowed at least four times by the temperature reduction - but that it would be accelerated seven times by the increase in acid concentration.

There is a dispute between counsel as to the validity of appellants' second assertion, that resinification should be expected with higher acid concentrations. The Solicitor for the Patent Office cited authority to show that such resinification occurs only under extreme [***11] conditions of pressure and temperature. Appellants in a reply brief give further citation to the same authority to show the conditions were not as drastic as indicated by the solicitor. However, even taking at full value all the statements of appellants, it still appears that the reaction is a slow one, taking as long as twelve hours or more for

completion, and that it is affected by temperature. There is no evidence to show that a chemist should necessarily expect that an increase in acid strength would be impracticable. As far as the evidence shows, the increased resinification due to stronger acidity might be negligible in its proportions, or it might be extensive. Experimentation would be indicated to determine the exact effect.

The third argument of appellants in this regard is that a chemist would assume that the reaction would be more likely to be explosive at a lower temperature. It is stated in appellants' brief:

A final consideration and one which is most important is the safety of the process. If the reaction time of the Hock et al. process were to be lengthened as by lowering the temperature, as the hydroperoxide is added to the acid the concentration of hydroperoxide [***12] would increase due to the slowness of the decomposition process. There would then be great danger of the reaction becoming exothermic and causing a violent explosion. Within the limits of the appealed claims, however, the reaction may be safely carried out. [Italics quoted.]

That a reaction would be more explosive at a lower temperature goes against all common experience, and is apparently based on a gratuitous assumption that the hydroperoxide will be added to the reaction solution faster than it is being decomposed. Whether or not the general proposition is correct, there is insufficient proof of it in this record for us to reverse the concurring decisions of the tribunals of the Patent Office.

Upon reviewing all of the evidence in the case, it is evident that the contentions of appellants cannot be upheld. Hock and Lang disclosed generally the process of decomposition of isopropyl benzene hydroperoxide by sulphuric acid, with the production of phenol and [*830] acetone. They described one experiment and its results, indicating in no way that this was the maximum yield obtainable. Any chemist reading the article could logically assume that higher yields might be [***13] obtainable, and by experimentally varying the conditions of temperature and acidity could find the most productive conditions. If it could be held that the skilled chemist would never think to reduce the temperature or increase the acid concentration, then it might be held that invention resides in so doing. However, appellants have not demonstrated such fact. The skilled chemist who chose to experiment with the reference process would undoubtedly try the conditions defined by the claims, although he might be surprised at the extent of improvement obtained. No invention is involved in discovering optimum ranges of a process by routine experimentation. *In re Swain et al.*, *supra*.

[4] Appellants suggest that the decision to experiment with the process in the first place involves inven-

42 C.C.P.A. 824, *; 220 F.2d 454, **;
1955 CCPA LEXIS 224, ***; 105 U.S.P.Q. (BNA) 233

tion, apparently on the theory that the process as disclosed by Hock and Lang appeared so impractical that no skilled chemist would have experimented with it. References have always been valid for what [**459] they would convey, explicitly or implicitly, to one skilled in the art. That experimentation may not have appeared promising is of no importance. It has been held that [HN3] a reference may [***14] be valid even though it states in so many words that its disclosure is not practical. *In re McKee et al.*, 25 C.C.P.A. (Patents) 1116, 96 F.(2d) 504, 37 USPQ 613; *In re Krukovsky et al.*, 38 C.C.P.A. (Patents) 731, 184 F.(2d) 333, 87 USPQ 110.

The Board of Appeals, in concluding its opinion, stated as follows:

* * * any one in possession of the information presented by Hock et al would naturally experiment to discover optimum conditions of temperature and concentration of acid for commercial exploitation of the process. Such experimentation is no more than the application of the expected skill of the chemical engineer and failure to

perform such experiments would, in our opinion, show a want of the expected skill of the engineer. * * *

That we are in complete agreement with the board's reasoning is clear from the foregoing discussion.

Some of the appealed claims, as noted above, specify the use of certain solvents in the process, in addition to the temperature and acid concentration limitations. The Primary Examiner stated that the reference showed the use of solvents, and stated that the choice of a particular solvent was within the skill of the art. The Board of Appeals [***15] affirmed this ground of rejection. Although appellants argue that this feature imparts patentability to the claims, no arguments are advanced sufficient to discredit the examiner's ruling in this respect.

It being apparent that the claimed process is merely different in degree and not in kind from the reference process, and that the criticality [*831] of the claimed ranges has not been shown, the decision of the Board of Appeals is affirmed.